New Dwarf Galaxies in the IC342/Maffei Group

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Abstract. This is a report on the detection of HI-emission from three 'new' dwarf galaxies Perseus A, Perseus B, and Camelopardalis D in the IC342/Maffei group of galaxies and of Draco A. The actual number of (probable) member galaxies of this group increases to 19 galaxies. Its velocity dispersion is 86 km s^{-1}. With a distance of 2.2±0.5 Mpc this group is the nearest to the Local Group and might have considerable dynamical influence on the Local Group.

1. Introduction

Due to its position within the zone of avoidance between the Andromeda region of the Local Group and the M81 group the IC342/Maffei group has been recognized only lately as a group. Since 1994 a great number of dwarf galaxies have been discovered in this area with growing interest for galaxies in the zone of avoidance. There have been blind HI surveys and optical searches for galaxies in the area. Recent discoveries of Dwingeloo 1 (Kraan-Korteweg et al. 1994, Huchtmeier et al. 1995), Dwingeloo 2 (Burton et al. 1996), Cas 1 (Huchtmeier et al. 1995), MB1 and 2 (McCall and Buta 1995, McCall et al. 1995), Cam B (Huchtmeier et al. 1997), MB3 (McCall and Buta 1997) have increased the number of known galaxies in this group considerably. Here we report HI-detection of the dwarf galaxies Camelopardalis D, Perseus A and B, and of Draco A in the area of the M81 group. [1] The IC342/Maffei group is the nearest group outside the Local Group with a photometric distance of 2.2 Mpc.

A new list of candidates of nearby dwarf galaxies from the sky survey of surface brightness dwarf galaxies based on the POSS II and ESO/SERC films has been searched for HI emission with the 100-m radiotelescope at Effelsberg. So far two lists of the Karachentsev survey have been published (Karachentseva and Karachentsev 1998, Karachentseva et al. 1999), HI observations of some of these

[1] Possibly more detections have been reported by Rivers 1998.

Figure 1. HI profiles of the 4 'new' dwarf galaxies in the area of the IC342/Maffei group observed with the 100-m radio telescope at Effelsberg, from left to right : Perseus A, Perseus B, Camelopardalis D, and Draco 1. All profiles but Perseus A have been Hanning smoothed. The channel spacing is 2.6 $\mathrm{km\,s^{-1}}$.

new dwarf galaxies have been reported (Huchtmeier et al. 1997, Huchtmeier et al. 1999). Among those newly discovered galaxies three are situated in the IC342/Maffei group according to their position and radial velocity.

2. Observations

Table 1. HI parameters of the 'new' dwarf galaxies in the area of the IC342/Maffei Group

Name	R.A. (1950.0)	Dec.	velocity	HI-flux	S_{max}	line-width
			$\mathrm{km\,s^{-1}}$	Jy $\mathrm{km\,s^{-1}}$	Jy	50% 20%
Perseus A	02 21 03.7	55 37 09	75±1	24.2	0.29±0.025	94 104
Perseus B	02 23 51.3	57 15 50	72±2	14.0	0.26±0.016	46 86
Cam D	05 53 23.1	73 25 24	111±2	2.1	0.08±0.008	23 34
Draco A	12 11 42.2	66 22 12	66±1	8.1	0.13±0.012	68 81

Observations were performed with the 100-m radio telescope at Effelsberg which has a half power beam width (HPBW) of 9.3' at the wavelength of 21-cm. Observations have been obtained in the total power mode combining the on-source position with a reference field. A bandwidths of 3.125 MHz was split into four channels yielding a channels spacing of 12.2 kHz and a resolution of 3.1 $\mathrm{km\,s^{-1}}$ (or 5.1 $\mathrm{km\,s^{-1}}$ after Hanning smoothing). For all galaxies four additional positions a beam width off the central position in R.A. and Dec. have been observed to check for extend of the HI. The HI emission was centered to the optical positions and nearly not extended compared to the HPBW. The profiles are shown in Fig. 1, the observed HI parameters in Table 1. Apart from Cam D all profiles seem partially confused by local HI which is seen best for Perseus A and B.

3. Discussion

The clustering of galaxies around IC342 and Maffei 1 (Fig. 2) within the zone of avoidance along the supergalactic equator in addition to the similar corrected

Table 2. Galaxies in the IC342/Maffei Group

Name	Type	optical diameter arc min	velocity v_0 $km\,s^{-1}$	M_B	M_{HI} $10^7 M_\odot$	M_{HI}/L_B
1	2	3	4	5	6	7
IC342	Scd	21.4 20.9	229	-20.3	355	0.34
Maffei I	E	3.3 1.7	224	-19.5		
Maffei II	Sbc	5.8 1.6	209	-19.5	35	0.04
Dw1	SBcd	4.2 0.3	309	-17.5	24	0.95
NGC 1569	IBm	3.6 1.8	87	-17.1	8	0.05
NGC 1560	Sd	11.6 0.8	164	-15.5	27	1.28
UGCA105	Im?	5.5 3.5	264	-15.3	20	1.12
UGCA 92	Im?	2.0 1.0	66	-14.0	6	0.49
UGCA 86	Im?	0.8 0.7	262	-12.7	8	0.93
Cas 1	dIm	1.9 1.6	264	-14.8	5	0.39
MB1	Sd	6.0 1.0	398	-12.5	2.2	1.44
Dw2	Im	6.4	291	-13.1	4.1	1.49
Cam B	Im	2.2 1.1	264	-12.1	0.3	0.28
Cam D	Im	0.6 0.5	278	-11.0	0.12	0.29
Perseus A	Im	1.4 0.8	288	-12.9	1.4	0.58
Perseus B	Im	1.7 0.5	283	-12.7	1.2	0.66
Cam C	dIm	1.8 0.4	151			
Cam A	dSph	3.7 2.1				
MB3	dSph	1.6 0.5				

radial velocities (Table 1) suggests strongly a typical group of galaxies. In the past greatly different distances have been quoted for this group , see discussion by Krismer et al. (1995) and by McCall and Buta (1997). In recent years photometric distances have been derived for 10 galaxies in this group (Karachentsev and Tikhonov 1993, 1994, Karachentsev et al. 1997, and unpublished work). These distances agree quite well with each other and yield a distance of 2.2±0.5 Mpc for the IC342/Maffei group. At such a close distance it might have played a significant role in the dynamical evolution of the Local Group (McCall 1986, 1989, Zheng et al. 1991, Valtonen et al. 1993, Peebles 1994).

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Figure 2. The distribution of galaxies in the area of the IC342/Maffei group (indicated by circles) along the supergalactic equator in galactic coordinates. Galaxies detected since 1994 are given by open circles.

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